

Claims:

1. A process for producing high-purity silicon by thermal decomposition of a silane-containing mixture in the gas phase and deposition of massive silicon,
5 wherein
the gas mixture used comprises monosilane, monochlorosilane and, if desired, further silanes.

2. The process as claimed in claim 1,
0 wherein
the gas mixture used comprises from 10 to 60% by weight of monosilane, from 10 to 60% by weight of monochlorosilane and from 0 to 15% by weight of further silanes, where the silanes present in the gas mixture add up to 100% by weight.

3. The process as claimed in claim 1 or 2,
5 wherein
the gas mixture used comprises monosilane and monochlorosilane together with at least one further silane from the group consisting of dichlorosilane and trichlorosilane.
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4. The process as claimed in any of claims 1 to 3,
wherein
5 a gas mixture as is obtained in the partial condensation after the dismutation of trichlorosilane is used.

5. The process as claimed in any of claims 1 to 4,
wherein
0 the thermal decomposition and deposition is carried out at a temperature in the range from 600 to 1250°C.

6. The process as claimed in any of claims 1 to 5,

wherein

the thermal decomposition and deposition is carried out at a pressure of from 1 mbar abs. to 100 bar abs.

- 5 7. The process as claimed in any of claims 1 to 6,
 wherein
 the process is carried out continuously.
- 10 8. The process as claimed in any of claims 1 to 7,
 wherein
 the silane-containing feed mixture is stored as liquid or gas in an intermediate
 storage from which the decomposition/deposition apparatus is supplied.
- 15 9. The process as claimed in any of claims 1 to 8,
 wherein
 at least one further gas from the group consisting of hydrogen, nitrogen and
 noble gas is added to the silane-containing feed mixture before the gas mixture
 is fed to the decomposition/deposition apparatus.
- 20 10. The process as claimed in any of claims 1 to 9,
 wherein
 at least part of the offgas from the decomposition/deposition apparatus is
 added to the silane-containing feed mixture.
- 25 11. The process as claimed in any of claims 1 to 9,
 wherein
 a tube reactor or a fluidized-bed reactor is used as decomposition/deposition
 apparatus and the thermal decomposition and deposition is carried out on solid
 pieces of silicon.
- 30 12. The use of a monosilane- and monochlorosilane-containing fraction from a

dismutation process for preparing monosilane as feed mixture in CVD processes for producing high-purity silicon.